Cornwall transit

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PROFILES

CORNWALL TRANSIT

Mid-Size Transit Operator Shows Savings are Possible with Natural Gas

Cornwall Transit has proven that natural gas can be a cost-effective transportation fuel for mid-size urban bus fleets, as well as large fleets. Today, the company is saving more than $13,000 a year in operating costs on each of its five natural gas buses.

Natural gas and transit fleets

Compressed natural gas (CNG) has long been considered an ideal fuel for urban transit buses because of its low cost and environmental benefits. However, the high cost of fast-fill CNG refuelling equipment has prevented small- and mid-size transit systems from making the move to natural gas. In 1994, Cornwall Transit decided to tackle the problem — and found an innovative solution.

Cornwall Transit serves the city of Cornwall, Ontario (population 50 000), with 33 buses that transport more than two million passengers per year.

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The conversion program

As a first step in the conversion program, Sherman Goodwin, Cornwall Transit Manager, changed his existing order for five diesel buses to five CNG buses. The price premium would be an additional $50,000 for each bus, and the original delivery date could still be met.

Next, a used slow-fill natural gas compressor was purchased from the local gas utility and installed outside the bus garage, with a discharge line running into the building. This eliminated the need for costly indoor storage of natural gas, which is generally required for fast-fill systems. It also reduced the cost of the compressor to about $75,000, plus $25,000 for installation.

Inside the garage, a refuelling system was installed at an additional cost of $35,000 (this includes the cost of the building modifications explained elsewhere). The system was installed along the length of one wall of the garage, where the CNG buses are parked between midnight and 6 a.m. for refuelling. All Cornwall Transit buses are off the road during these hours, so the refuelling did not affect the availability of the CNG buses.

The conversion program also required modifications to the garage itself, including replacement of the building's original electrical heating system with ten gas-fired radiant tube heaters and one gas-fired rooftop makeup air unit. As well, four existing exhaust fans were modified to draw air from both the ceiling area and the floor level. All electrical equipment in the garage capable of producing sparks was made explosion proof.

Impressive results

In 1995, while the CNG buses were still under warranty, Cornwall Transit put them to a gruelling test. The buses were driven an average of 74 000 kilometres each over the 12-month period, compared to an average of 22 500 kilometres for the diesel buses. The CNG buses came through with "flying colours."

Cornwall Transit has estimated the average cost of operating a CNG bus to be $0.17 per kilometre — less than half the cost of an identical diesel bus at $0.35 per kilometre. Over the entire year, the company estimates it saved an average of $13,300 per vehicle with the CNG buses, compared to driving a diesel bus over the same distance. The savings are almost entirely

Sensors were also installed to monitor carbon monoxide and nitrous oxide levels in the bus storage area. A signal from one sensor triggers two of the exhaust fans and the makeup air unit. Signals from two sensors start all four exhaust fans and the makeup air unit. Additional sensors were installed above the refuelling port for each bus to monitor natural gas levels. If any of these detect gas levels at 20 per cent of the concentration where natural gas will explode in air, the following safety precautions automatically occur:

1. The natural gas compressor shuts down.
2. Ventilation of the garage increases.
3. The natural gas heaters shut off.
4. An audible alarm sounds to warn occupants of the situation. The alarm shuts off only when natural gas levels are below 20 per cent of the explosive level. At this point, the ventilation system continues to operate and the compressor remains shut down until the control is manually reset.

The capital investment

The total capital cost of the project was approximately $485,000 (including the $250,000 premium for the natural gas buses). In an unrelated retrofit project, Cornwall Transit had previously upgraded the ventilation system in the garage at a cost of $100,000 (newer transit buildings with modern ventilation systems could likely be modified at a much lower cost).

The Ontario Ministry of Transportation agreed to include the additional cost of the buses, the compressor and the building upgrades in its 75 per cent capital-cost grant allocation.

because of the difference in cost between natural gas and diesel fuel. As well, although exact figures are not yet available, maintenance costs are expected to be slightly lower for the natural gas buses compared to their diesel counterparts.

For the most part, Cornwall Transit's drivers have noticed little difference between the on-street performance of CNG and diesel buses. Although drivers noticed slower acceleration from stops with the natural gas buses, this is considered a plus in terms of passenger comfort.

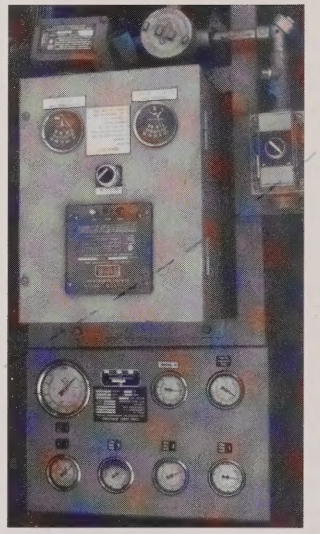
As a result, Cornwall Transit recovered $363,000 of its investment. The remainder will be repaid through fuel-cost savings. Another financing option would be through a surcharge on the purchase of natural gas.

Positive public reaction and industry interest

Mr. Goodwin reports that public feedback has been overwhelmingly positive. The commitment to "clean natural gas" has been widely praised in local media and trade magazines, and inquiries have been received from transit systems across Canada and in the United States.

"Our experience has changed industry thinking on what can be accomplished by a small transit operator," acknowledges Mr. Goodwin.

Cornwall Transit does not intend to convert its existing diesel buses to natural gas because of the relatively high cost of the conversions ($35,000 to $40,000 per vehicle). However, Mr. Goodwin anticipates that as the company's diesel buses go out of service, they will be replaced by new CNG buses. "We will definitely be looking to add more natural gas buses to our fleet as time goes on."



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